

New records of Encyrtidae (Hymenoptera, Chalcidoidea) from Norway II

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The collection of the family Encyrtidae at the Natural History Museum of Oslo is revised, and this study focuses on the ethanol preserved material in particular. Eighteen species are reported for the first time from Norway, bringing the total number of Norwegian encyrtids up to 71. Comments on the biology and distribution for these species are given. The aim of this study is to highlight the distribution of the family in Norway and to produce a complete list of the Norwegian species.

Key words: Chalcidoidea, Encyrtidae, new records, Norway.

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Introduction

One of the most important agents in biological control of insects harmful to plants is the chalcid family Encyrtidae. They are, together with the family Aphelinidae, successfully used against many pest-species, especially scale insects (Hemiptera, Coccoidea) (Noyes 1985, Nikolskaya & Yasnosh 1966). More than 400 species have been used worldwide as biological control agents of insect pests (Greathead 1986, Neueschwander *et al.* 1990, Noyes 1985, 2013). Parasitoids like encyrtids are the major component of many terrestrial ecosystems and may constitute up to 20% of all insect species (LaSalle & Gauld 1991, Godfray 1994, Memmot *et al.* 1994).

This is the third paper on Norwegian Encyrtidae based on the holdings at the Natural History Museum in Oslo. The previous were Hansen *et al.* (2012) and Japoshvili *et al.* (2013). The aim of these contributions is to highlight the distribution

of the family Encyrtidae in Norway, to produce a complete list of the Norwegian species, and finally provide a catalogue of Norwegian Chalcidoidea.

Material and Methods

This contribution focuses on ethanol preserved material of Encyrtidae in the collections at the Natural History Museum in Oslo. The material was dried using ethanol and hexamethyldisilazane (HMDZ), then card mounted, or, if necessary, slide mounted following the guidelines of Noyes (2013). For identification the general key for Palaearctic encyrtids (Trjapitzin 1989) was used, in addition to other related publications on lower taxa (e.g. Gibson *et al.* 1997, Guerrieri & Noyes 2005).

The faunistic divisions within Norway follows Økland (1981), and are given in **bold**. The «European Invertebrate System» (EIS) follows

Endrestøl (2005), and the coordinates given refer to the «Military Grid Reference System» (MGRS) and World Geodetic System 84 (WGS84). The taxonomy follows Noyes (2013). All records refer to fully labelled specimens deposited in the collections at the Natural History Museum of Oslo.

List of species

Ageniaspis longicornis Trjapitzin, 1968

Material examined: BØ, Hurum: Mølen [NW] [EIS 19; 32V NL 8492 9548 ±10m], 1♀ 17 June–10 July 2010, leg. Lars Ove Hansen.

Biology: No information (Noyes 2013).

Distribution: Europe: Norway, Sweden; Asia (Caucasus) (Noyes 2013).

Blastothrix longipennis Howard, 1881

Material examined: AK, Oslo: Maridalen, Kirkeby [NW] [EIS 36; 32V NM 9809 5229 ±25m] 11♀♀ 31 July–13 December 2007 Malaise-trap [A] / meadow, leg. Anders Endrestøl & Lars Ove Hansen; BØ, Hurum: Klokkarstua [W] [EIS 28; 40m a.s.l.; 32V NM 8154 0989 ±10m] 1♀ 19 May–3 June 2010 Malaise-trap [2] / W-facing sandy slope, leg. Lars Ove Hansen.

Biology: No information (Noyes 2013).

Distribution: Europe: Croatia, Czech Republic, Finland, Germany, Hungary, Moldova, Norway, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Turkey, Ukraine, and UK; North Africa; and Asia (Noyes 2013).

Charitopus fulviventris Förster, 1860

Material examined: BV, Rollag: Vårviken [EIS 35; 32V NM 1443 5315 ±50m] 1♀ 1–31 July 1994 Malaise-trap / sand-pit, leg. Lars Ove Hansen & Bjørn A. Sagvolden.

Biology: No information (Noyes 2013).

Distribution: Europe: Croatia, Czech Republic, Finland, Germany, Hungary, Moldova, Norway, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Turkey, Ukraine, and UK; North Africa; and Asia (Noyes 2013).

Copidosoma dius (Walker, 1837)

Material examined: AK, Asker: Konglungen, Spirabukta [EIS 28; 32V NM 8385 3387 ±500m] 1♂ 28 June 2008, leg. Ove Sørlibråten.

Biology: Parasitoid on different species of Lepidoptera; in particular of the genus *Elachista* (Elachistidae) (Noyes 2013).

Distribution: Europe: Austria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Slovakia, Spain, Sweden, Ukraine, and UK; Asia (Caucasus) (Noyes 2013).

Habrolepis italicus Delucchi, 1965

Material examined: TEY, Drangedal: Steinknapp [E501835 N6548612] 1♀ 29 June 2011 oak canopy fogging / tree#09, leg. Karl H. Thunes.

Biology: Parasitoid on *Asterodiaspis ilicicola* (Targioni Tozzetti, 1888), *A. variolosa* (Ratzeburg, 1870), *Asterodiaspis* spp. and *Asterolecanium* spp. (Coccoidea) (Noyes 2013)

Distribution: Europe: Bulgaria, Italy, Montenegro, Norway, Turkey, and Ukraine; North Africa (Noyes 2013).

Homalotyloidea aphycomorpha Mercet, 1925

Material examined: BV, Rollag: Vårviken [EIS 35; 32V NM 1443 5315 ±50m] 1♀ 1–31 July 1994 Malaise-trap / sand-pit, leg. Lars Ove Hansen & Bjørn A. Sagvolden.

Biology: No information (Noyes 2013).

Distribution: Europe: Croatia, Hungary, Norway, and Spain (Noyes 2013).

Isodromus flaviceps (Dalman, 1820)

Material examined: AK, Ullensaker: Sessvollmoen, Aurtjernet [W] [EIS 37; 200m.a.s.l.; 32V PM 1722 7907 ±25m] 1♀ 25 August–24 November 2007 Malaise-trap [C] / sandy pine forest, leg. Lars Ove Hansen.

Biology: Parasitoid on *Phenacoccus aceris* (Signoret, 1875) (Coccoidea) (Noyes 2013).

Distribution: Europe: Finland, Norway, Poland, Russia, Sweden, and UK (Noyes 2013).

Microteris bellae Trjapitzin, 1968

Material examined: BØ, Hurum: Klokkarstua [W] [EIS 28; 40m.a.s.l.; 32V NM 8154 0989

±10m] 1♀ 19 May–3 June 2010 Malaise-trap [2] / W-facing sandy slope, leg. Lars Ove Hansen.

Biology: Parasitoid on *Eulecanium caraganae* Borchsenius, 1953, *E. sachalinense* Danzig, 1972, *E. secretum* Borchsenius, 1955, *Rhodococcus perornatus* (Cockerell & Parrott, 1899), *Rh. rosaeluteae* Borchsenius, 1953, *Rh. spiraeae* (Borchsenius, 1949) (Coccoidea) (Noyes 2013).

Distribution: Europe: Norway, Russia, and Turkey; Asia (Noyes 2013).

***Ooencyrtus nigerrimus* Ferriere & Voegelé, 1961**

Material examined: BV, Rollag: Vårviken [EIS 35; 32V NM 1443 5315 ±50m] 2♀♀ 1–31 July 1994 Malaise-trap / sand-pit, leg. Lars Ove Hansen & Bjørn A. Sagvolden.

Biology: Parasitoid on eggs of different species of Pentatomidae; in particular *Aelia*, *Carpocoris* and *Graphosoma* (Hemiptera) (Noyes 2013).

Distribution: Europe: Norway; Asia: North Africa (Noyes 2013).

***Prochiloneurus bolivari* Mercet, 1919**

Material examined: BV, Rollag: Vårviken [EIS 35; 32V NM 1443 5315 ±50m] 1♀ 1–31 July 1994 Malaise-trap / sand-pit, leg. Lars Ove Hansen & Bjørn A. Sagvolden.

Biology: Biology not well studied; probably secondary parasitoid of many Coccoids.

Distribution: Europe: Austria, Bulgaria, Croatia, Czech Republic, Denmark, Yugoslavia [pre 1991], Finland, France, Hungary, Italy, Lithuania, Moldova, Norway, Poland, Romania, Russia, Slovakia, Spain, Sweden, Ukraine, UK; Africa; Asia (Noyes 2013).

***Pseudencyrtus misellus* (Dalman, 1820)**

Material examined: BØ, Røyken: Kinnartangen, Kolåsen [EIS 28; 75m.a.s.l.; 32V NM 75192 20432 ±5m] 1♀ 12 September–19 October 1991 Malaise-trap / S-facing slope, leg. Lars Ove Hansen.

Biology: Parasitoid of some Cecidomyiidae (Diptera) (Noyes 2013).

Distribution: Europe: Denmark, Finland, Germany, Hungary, Lithuania, Netherlands, Norway, Russia, Sweden and UK; Asia (Noyes 2013).

***Psyllaephagus ogazae* Sugonjaev, 1968**

Material examined: BØ, Modum: Morud [E] [EIS 35; 175m.a.s.l.; 32V NM 4782 5857 ±25m] 1♀ 27 July–1 August 2009 yellow pan-trap / meadow / sandy pine forest, leg. Lars Ove Hansen & Eirik Rindal.

Biology: Parasitoid on *Caillardia notata* Loginova, 1956 and *C. robusta* Loginova, 1856 (Hemiptera, Psylloidea) (Noyes 2013).

Distribution: Europe: Norway; Asia (Noyes 2013).

***Syrphophagus annulipes* (Thomson, 1876)**

Material examined: AK, Ullensaker: Sessvollmoen [W] [EIS 37; 204m.a.s.l.; 32V PM 1777 8051 ±25m] 1♀ 26 June–25 August 2007 malaise-trap [B] / sandy pine forest, leg. Lars Ove Hansen.

Biology: *Therioaphis trifolii* Monell, 1882, *Tuberculatus annulatus* (Hartig, 1841), *Calaphis* sp. (Hemiptera, Aphidoidea) (Noyes 2013).

Distribution: Europe: Czech Republic, Hungary, Netherlands, Norway, Slovakia and Sweden (Noyes 2013).

***Syrphophagus aeruginosus* (Dalman, 1820)**

Material examined: AK, Oslo: Maridalen, Kirkeby [NW] [EIS 36; 32V NM 9809 5229 ±25m] 1♀ 31 July–13 December 2007 Malaise-trap [A] / meadow, leg. Anders Endrestøl & Lars Ove Hansen; BV, Rollag: Vårviken [EIS 35; 32V NM 1443 5315 ±50m] 3♀♀ 1–31 July 1994 Malaise-trap / sand-pit, leg. Lars Ove Hansen & Bjørn A. Sagvolden.

Biology: Parasitoid on different Syrphidae (Diptera) and Aphididae (Hemiptera) (Noyes 2013).

Distribution: Europe: Austria, Bulgaria, Croatia, Czech Republic, Finland, France, Germany, Hungary, Madeira, Moldova, Montenegro, Netherlands, Norway, Portugal, Romania, Russia, Serbia, Slovakia, Sweden, Switzerland, Turkey, Ukraine, and UK; Africa; Asia (Noyes 2013).

***Trjapitzinellus nigricornis* Hoffer, 1976**

Material examined: AK, Oslo: Ekebergskråningen [SE] [EIS 28, 32V NM 9891 4023 ±25m] 1♀ 8 July–19 August 2008 Malaise-trap /

W-facing slope, leg. Anders Endrestøl.

Biology: No information known (Noyes 2013).

Distribution: Europe: Czech Republic, Finland, Norway, Poland, Russia, and Sweden (Noyes 2013).

***Trichomasthus bavarici* Hoffer, 1965**

Material examined: BØ, Hurum: Klokkekarstua [W] [EIS 28; 40m.a.s.l.; 32V NM 8155 0989 ±10m] 1♀ 19 May–3 June 2010 Malaise-trap [2] / W-facing sandy slope, leg. Lars Ove Hansen.

Biology: Parasitoid on *Diaspidiotus bavaricus* (Lindinger, 1912) (Coccoidea) (Noyes 2013).

Distribution: Europe: Czech Republic, Norway, and Russia (Noyes 2013).

***Tyndarichus melanacis* (Dalman, 1820)**

Material examined: AK, Asker: Konglungen, Spirabukta [EIS 28; 32V NM 8385 3387 ±500m] 1♀ 28 June 2008, leg. Ove Sørlibråten.

Biology: Parasitoid on *Zeuzera pyrina* (L., 1761) and *Agrotis segetum* (Denis & Schiffermüller, 1775) (Lepidoptera) (Noyes 2013).

Distribution: Europe: Austria, Czech Republic, Denmark, Estonia, Finland, Germany, Hungary, Italy, Lithuania, Moldova, Montenegro, Norway, Romania, Russia, Slovakia, Spain, Sweden, Ukraine, and UK; Asia, (Noyes 2013).

***Zaomma lambinus* (Walker, 1838)**

Material examined: AK, Oslo: Ekebergskråningen [SE] [EIS 28; 32V NM 9891 4023 ±25m] 1♀ 8 July–19 August 2008 Malaise-trap / W-facing slope, leg. Anders Endrestøl.

Biology: Secondary parasitoid of many Coccoidea (Noyes 2013).

Distribution: Europe: Austria, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Moldova, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Spain, Sweden, Switzerland, Turkey, Ukraine, and UK; North Africa; Asia; and South America (Noyes 2013).

Discussion

A total of 18 species of encyrtids not hitherto reported from Norway, was recorded during this investigation, and the number of Norwegian species in the family increased to 71. Ottesen (1993) estimated the number of Norwegian encyrtids to be 120, but we expect more species for Norway to be discovered in the future. As most of the studied material was collected using Malaise-traps, we have no information about host associations on these species. However, this reveals valuable information, and may be used to give predictions about the fauna and probable hosts of Norwegian encyrtids.

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